View metadata, citation and similar papers at core.ac.uk
brought to you by CORE
provided by Elsevier - Publisher Connector

Case Report

Plasmacytoma Mimicking Mediastinal Parathyroid Tumour in a Patient with Primary Hyperparathyroidism

Jubbin Jagan Jacob, Mathew John, Meera Thomas,[1] Nihal Thomas and Aravindan Nair,[2] Departments of Endocrinology, [1]Pathology, and [2]Endocrine Surgery, Christian Medical College and Hospital, Vellore, India.

The association of monoclonal gammopathies with primary hyperparathyroidism is well documented. Many case reports have documented the coexistence of primary hyperparathyroidism and multiple myeloma. The cause of this relationship is not known. We report the case of a 49-year-old gentleman who was treated for primary hyperparathyroidism. His initial preoperative nuclear scan had shown persistent activity and retention of tracer in the retrosternal region in addition to the discrete hot spot in the region of the lower pole of the left lobe of the thyroid. During surgery, the enlarged left inferior parathyroid gland was removed. In addition, the retrosternal area was also explored and found to be normal. Ten months later, he developed a mass in the region of the manubrium sternii which was proven to be a plasmacytoma. We review the literature for similar cases and suggest hypotheses for a possible association. In conclusion, coexisting plasma cell dyscrasias including plasmacytoma should be considered in patients with primary hyperparathyroidism. [*Asian J Surg* 2007;30(2):147–50]

Key Words: intact parathyroid hormone, monoclonal gammopathy, plasmacytoma, primary hyperparathyroidism, technetium 99 sestamibi isotope scan

Introduction

The association of monoclonal gammopathy (MG) with primary hyperparathyroidism (PHPT) is well documented. The first patient with PHPT and MG was described by Clubb et al.[1] The patient had disappearance of the monoclonal immunoglobulin after successful resection of parathyroid adenoma. A number of case reports of primary hyperparathyroidism coexisting with multiple myeloma are available in the literature.[2–15,18] The association suggests a possible link between the two conditions. However, other case reports have not documented any postoperative disappearance of monoclonal immunoglobulin after successful excision of the parathyroid tumour. Therefore, the relationship between the two disorders is still undetermined.

We report a case of a 49-year-old gentleman who underwent bilateral neck exploration and excision of left inferior parathyroid adenoma. He presented to us within 6 months of successful surgery with a single plasmacytoma. To the best of our knowledge, this is the first case report documenting these two disorders in the same patient.

Case report

A 49-year-old man was referred to us with symptomatic renal calculi and bilateral hydronephrosis. On work up for metabolically active renal stone disease, he was found to have repeated high calcium values with normal inorganic phosphorus and a mildly deranged renal function. Serum intact parathyroid hormone (PTH) values were found to

Address correspondence and reprint requests to Dr Nihal Thomas, Department of Endocrinology, Christian Medical College, Vellore 632004, Tamil Nadu, India.
E-mail: nihal_thomas@yahoo.com • Date of acceptance: 10 March 2006

© 2007 Elsevier. All rights reserved.

be elevated. The details of his laboratory tests are given in the Table. An ultrasound of the neck detected a single large adenoma in the region of the left inferior parathyroid gland. The technetium (Tc^{99}) sestambi scan showed uptake consistent with a left inferior parathyroid adenoma. There was additional uptake in the region of the manubrium sternii (Figure 1) which was reported as a possible second retrosternal adenoma. He underwent bilateral neck exploration and a parathyroid adenoma around 4 cm in diameter was removed from the region of the left inferior parathyroid gland. The presence of increased uptake in the region of the manubrium sternii on delayed sestamibi imaging prompted an exploration of the substernal region and inspection of the manubrium sternii was carried out intraoperatively with negative results. The other glands were normal on inspection. Histopathological examination was consistent with a parathyroid adenoma (Figure 2). The patient had an uneventful recovery with normalization of serum calcium levels.

Table. Selected initial laboratory values prior to parathyroid surgery

Laboratory tests	Results	Normal range
Calcium (mmol/L)	2.85	2.08–2.60
Phosphorus (mmol/L)	1.13	0.81–1.49
PTH plasma (ng/L)	1,416	8.0–74.0
Alkaline phosphatase (U/L)	128	40–125
Creatinine (μmol/L)	150.3	44.2–123.8

Ten months later, the patient presented to us with a painful progressive swelling in the region of the upper sternum of 6 months duration. Computed tomography imaging suggested a vascular mass arising superficially from the sternum (Figure 3). His biochemical and haematological parameters were normal. Fine needle aspiration

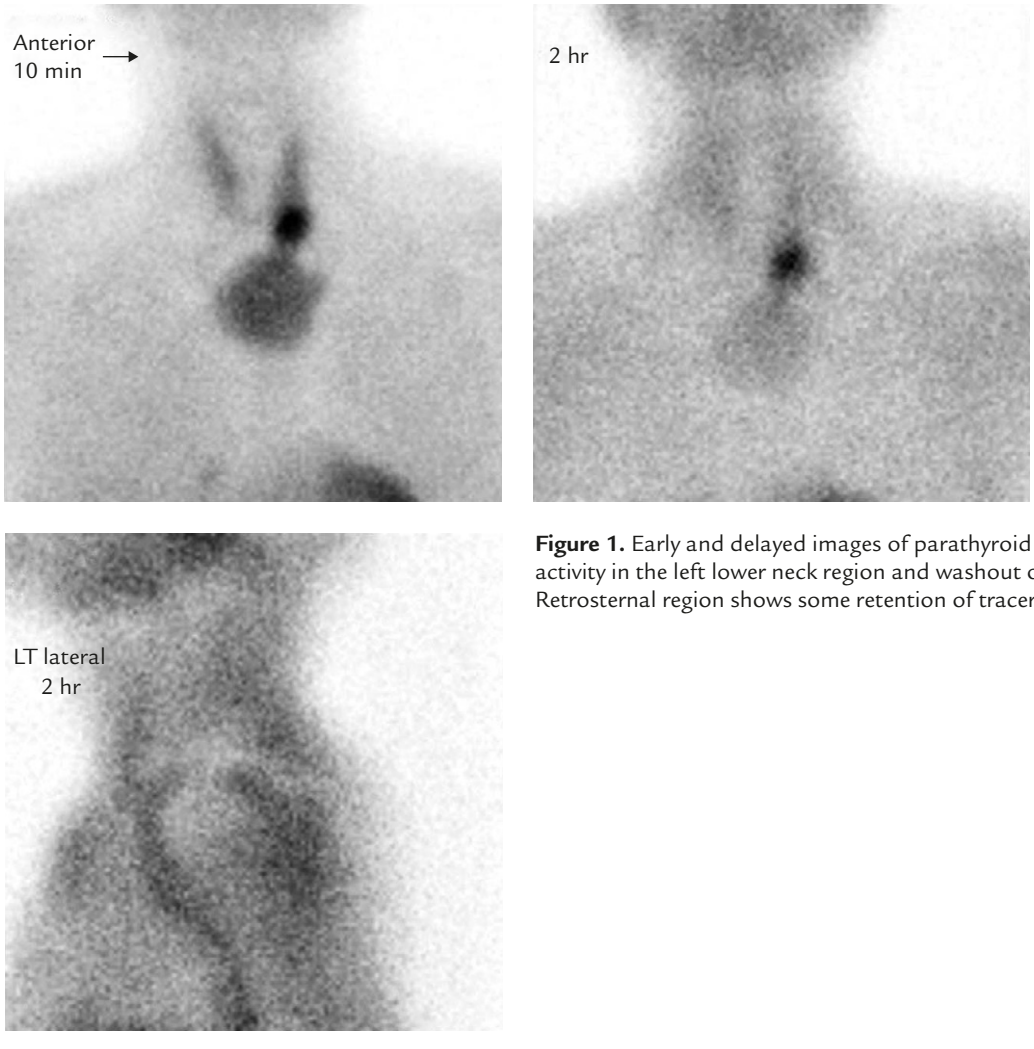

Figure 1. Early and delayed images of parathyroid scintigraphy show persistent activity in the left lower neck region and washout of activity from thyroid lobes. Retrosternal region shows some retention of tracer.

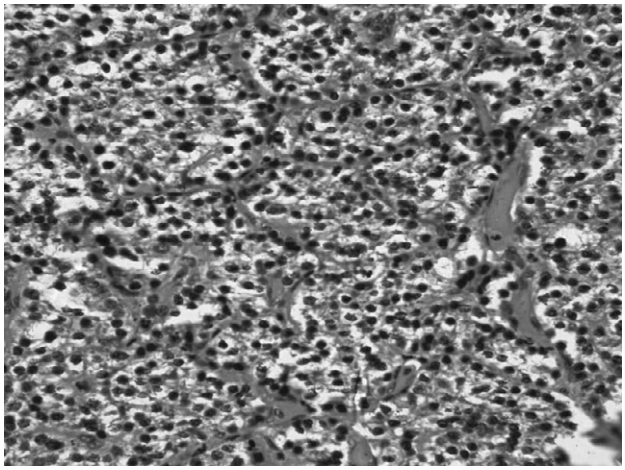

Figure 2. Haematoxylin and eosin stain of the left inferior parathyroid adenoma under 400× magnification.

Figure 3. Computed tomography shows the plasmacytoma in relation to the manubrium sternii.

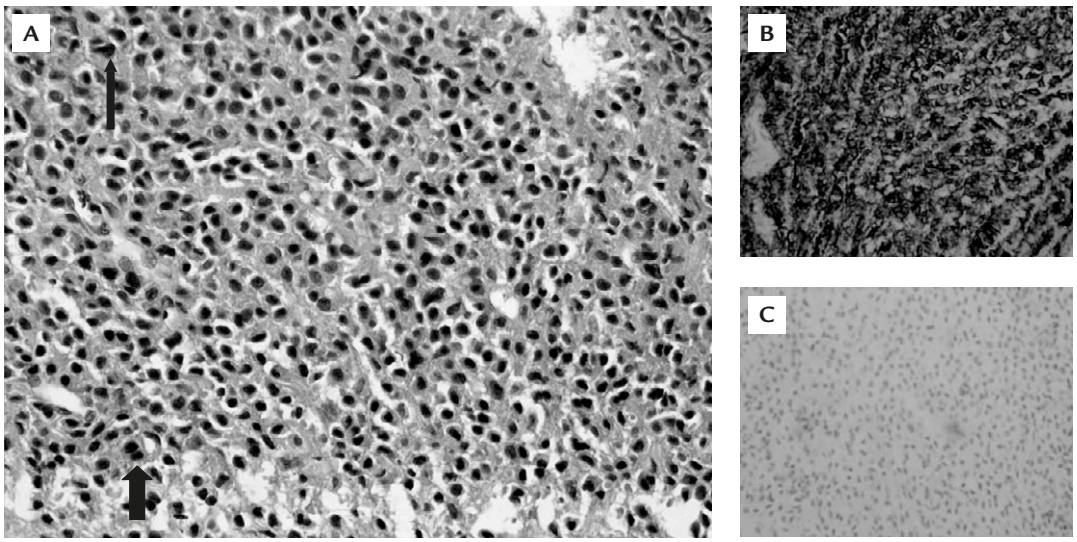

Figure 4. (A) Haematoxylin and eosin stain of the sternal plasmacytoma under 400× magnification shows plasma cells with atypical nuclei (thin arrow) and binucleation (thick arrow). (B) Positive staining for CD138 and (C) negative staining for CytoK immunostaining.

cytology suggested a neoplastic lesion. He underwent a Trephine biopsy of the mass. The histopathology was consistent with a plasmacytoma (Figure 4). Bone marrow aspirate did not show any increase in plasma cells. A diagnosis of plasmacytoma was established. He was referred for radiotherapy.

Discussion

This case represents the first documentation of the coexistence of primary hyperparathyroidism with plasmacytoma. A review of the literature reveals at least 17 cases where PHPT coexisted with multiple myeloma.[1–15,18] In a majority of the cases reported, the patients were elderly and a plausible consideration is simple coincidence of the two disorders. However, there is a single prospective study that has shown a significant increase in the prevalence of MG in patients with PHPT.

The prevalence of MG in healthy population is estimated to be approximately 1% by several large analyses of electrophoretic data in different populations.[16,17] The prevalence increases with age and may be as high as 6.1% in healthy individuals older than 70 years.[16] In contrast, the prevalence of MG in adults < 50 years old is low (0.2%). A recent prospective study looked at 101 consecutive patients with PHPT in whom serum immunoglobulin was systematically studied using agarose gel electrophoresis and immunofixation before and after parathyroid surgery.

MG was detected in 10% of patients with PHPT and this included two patients in whom it was associated with multiple myeloma compared to 2% among 127 patients who underwent other surgeries.[18]

In patients reported with myeloma and PHPT, the commonest presentation was the recurrence of hypercalcaemia after successful parathyroid surgery with suppressed PTH levels.[3] Other patients presented with hypercalcaemia in multiple myeloma which was unresponsive to therapy directed at the tumour and had elevated PTH levels. Subsequent localization and excision of the coexisting parathyroid tumour restored the serum calcium to normal levels.[2]

The relationship between MG and PHPT remains speculative. Soluble factors secreted by one type of tumour cell may trigger the growth of the other. Monoclonal immunoglobin may act as a growth factor for parathyroid cells as does the immunoglobin G called thyroid stimulating antibodies on thyroid cells.[19] Alternatively, PTH may stimulate osteoblastic cells to secrete high levels of interleukin-6.[20] This elevated cytokine level plays a key role in development of a plasma cell disorder.[21] High PTH levels may further facilitate the emergence and growth of the plasma cell clone.

Sporadic hyperparathyroidism is associated with overexpression of the proto-oncogene PRAD1/cyclin 1 (parathyroid adenoma 1) on chromosome 11q13 in a significant number of patients. This gene encodes a cyclin protein called cyclin D1 which may play an important role in the control of cell cycle at the G1-S transition. Subsequent reports have associated the overexpression of this gene in various types of B cell lymphomas, myelomas and other solid tumours.[22] Thus, it is speculated that an inherited or acquired gene defect may predispose a patient to both these diseases.

References

1. Clubb JS, Posen S, Neale FC. Disappearance of a serum paraprotein after parathyroidectomy. *Arch Intern Med* 1964;114:616–20.
2. Khandwala HM, Boctor MA. Multiple myeloma presenting with recurrent hypercalcemia in a patient with a history of primary hyperparathyroidism: report of case and review of literature. *Endocr Pract* 2004;10:345–7.
3. Goto S, Yoshioka M, Nagai K, et al. Primary hyperparathyroidism associated with multiple myeloma. *Intern Med* 1995;34:988–91.
4. Sopena B, Rodriguez G, Fuente J, et al. Two causes of hypercalcemia: learning by the Holmesian method. *Mayo Clin Proc* 2004;79:708.
5. Toussirot E, Bille F, Henry JF, et al. Coexisting kappa light chain multiple myeloma and primary hyperparathyroidism. *Scand J Rheumatol* 1994;23:49–50.
6. Chisholm RC, Weaver YJ, Chung EB, et al. Parathyroid adenoma and light chain myeloma. *J Natl Med Assoc* 1981;73:875–80.
7. Francis RM, Bynoe AG, Gray C. Hypercalcaemia due to the coexistence of parathyroid adenoma and myelomatosis. *J Clin Pathol* 1982;35:732–6.
8. Stone MJ, Lieberman ZH, Chakmakjian ZH, Matthews JL. Coexistent multiple myeloma and primary hyperparathyroidism. *JAMA* 1982;247:823–4.
9. Hoelzer DR, Silverberg AB. A primary hyperparathyroidism complicated by multiple myeloma. *Arch Intern Med* 1984;144:2069–71.
10. Schnieder W, Thomas M. Hypercalcemia in coexistent parathyroid adenoma and multiple myeloma. Problems of differential diagnosis. *Dtsch Med Wochenschr* 1989;114:1199–202.
11. Rosen C, Segal H, Hartz CE, et al. Primary hyperparathyroidism in an elderly patient with multiple myeloma. *J Am Geriatr Soc* 1992;40:703–5.
12. Mundis RJ, Kyle RA. Primary hyperparathyroidism and monoclonal gammopathy of undetermined significance. *Am J Clin Pathol* 1982;77:619–21.
13. Rao DS, Antonelli R, Kane KR, et al. Primary hyperparathyroidism and monoclonal gammopathy. *Henry Ford Hosp Med J* 1991;39:41–4.
14. Jackson RM, Orland MJ. Parathyroid adenoma in a patient with multiple myeloma. *South Med J* 1979;72:1336–7.
15. Sarfati E, de Ferron P, Dubost C, et al. Multiple myeloma associated with primary hyperparathyroidism caused by an adenoma. *Ann Med Interne (Paris)* 1985;136:684. [In French]
16. Axelsson U, Bachmann R, Hallen J. Frequency of pathological proteins (M-components) in 6995 sera from an adult population. *Acta Med Scand* 1966;179:235–47.
17. Malacrida V, De Francesco D, Banfi G, et al. Laboratory investigation of monoclonal gammopathy during 10 years of screening in a general hospital. *J Clin Pathol* 1987;40:793–7.
18. Arnulf B, Bengoufa D, Sarfati E, et al. Prevalence of monoclonal gammopathy in patients with primary hyperparathyroidism. *Arch Intern Med* 2002;162:464–7.
19. Weetman AP, Yateman ME, Ealey PA, et al. Thyroid-stimulating antibody activity between different immunoglobulin G subclasses. *J Clin Invest* 1990;86:723–7.
20. Greenfield EM, Horowitz MC, Lavish SA. Stimulation by parathyroid hormone of interleukin-6 and leukemia inhibitory factor expression in osteoblasts is an immediate-early gene response induced by cAMP signal transduction. *J Biol Chem* 1996;271:10984–9.
21. Treon SP, Anderson KC. Interleukin-6 in multiple myeloma and related plasma cell dyscrasias. *Curr Opin Hematol* 1998;5:42–8.
22. Seto M, Yamamoto K, Iida S, et al. Gene rearrangement and over expression of PRAD1 in lymphoid malignancy with t(11;14)(q13;q32) translocation. *Oncogene* 1992;7:1401–6.